

## Claims

What is claimed is:

1. Materials for cathode in solid oxide fuel cells(SOFCs), comprising:

an oxide having oxygen vacancies and high conductivity as cathode, wherein cathode accelerating absorption of oxygen molecule and diffusion of oxygen ion; said materials having general form as  $\text{Ln}_{1-x}\text{A}_x\text{Cu}_{1-y}\text{B}_y\text{O}_{2.5\pm\delta}$ , wherein Ln is lanthanide ion, A is alkaline-earth metal, B is metal, X is greater than or equal to 0 and less than or equal to 1, Y is greater than or equal to 0 and less than 0.99,  $\delta$  is greater than or equal to 0 and less than or equal to 0.5;and doping different alkaline-earth metals to said A, conversing partly copper(Cu) to trivalence copper ion, forming perovskite having oxygen vacancies with regularity sequence, utilizing catalytic accelerating cathode reaction of cathode electrode, compounding electron being conducted though external circuit with conversing oxygen to forming oxygen ion ,obtaining anode and hydrogen reaction by diffusing oxygen ion to electrolyte.

2. The materials according to claim 1, wherein said materials comprise at least 1% copper(Cu).

3. The materials according to claim 1, wherein lanthanum (La) is selected from the group consisting of cerium(Ce), praseodymium(Pr), neodymium(Nd), promethium(Pm), stannum(SN), europium(Eu), gadolinium(Gd), terbium(Tb), dysprosium(Dy), holmium(Ho), erbium(Er), thulium(Tm), ytterbium(Yb) and lutetium(Lu).
4. The materials according to claim 1, wherein said alkaline-earth metal is selected from the group consisting of beryllium(Be), magnesium(Mg), calcium(Ca), strontium(Sr), barium(Ba) and radium(Ra)
5. The materials according to claim 1, wherein said metal is selected from the group consisting of cobalt(Co), iron(Fe), nickel (Ni), zinc (Zn), manganese (Mn), aluminum(Al), vanadium(V), iridium(Ir), molybdenum (Mo), palladium (Pd), platinum(Pt), magnesium (Mg), ruthenium(Ru), rhodium(Rh), chromium(Cr) and zirconium (Zr).
6. The materials according to claim 1, wherein said  $\text{Ln}_{1-x}\text{A}_x\text{Cu}_{1-y}\text{B}_y\text{O}_{2.5\pm\delta}$  is

operating temperature in a range of 400-800 degrees Celsius.

7. The materials according to claim 1, wherein said materials for cathode is the  $\text{ABO}_{2.5\pm\delta}$ .